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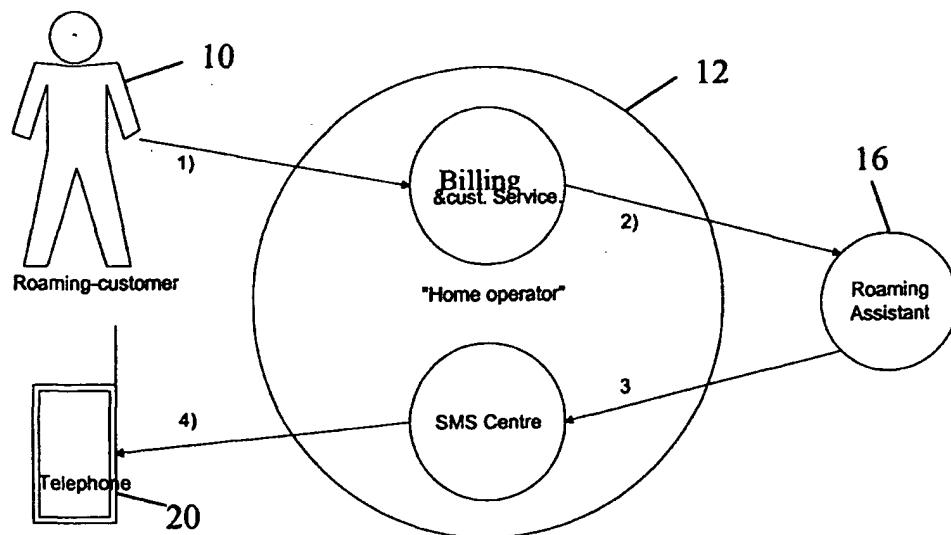
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(54) Title: METHOD AND SYSTEM FOR SELECTING SERVICE PROVIDER BASED ON ROAMING CHARGES



WO 02/32181 A1



(57) Abstract: The invention relates to a procedure and a system for choosing an operator (22) in a cellular mobile telephone system when roaming between operators (12, 22), for example in towns and countries. A user (10) specifies himself through using a program application for roaming which operator (22) is most cost-effective at a given point in time.

Method and system for selecting service provider based on roaming charges**Technical area**

The present invention relates to a procedure and a system for choosing an operator in a cellular mobile telephone system when roaming between different mobile telephone operators.

Prior art

During so-called "roaming" with a mobile telephone between countries or, in some countries such as the USA, between towns, i.e. between places where an operator other than the one that normally provides carriers of mobile telephones with mobile telephone services, problems arise when the new operator is to be chosen. Normally, several mobile telephone operators offer their services in a country, whereby the cost of a call can vary significantly between operators. The cost also varies with regard to the time of day.

When performing roaming, e.g. between two countries with the same type of mobile telecommunications system, for example, GSM or a similar cellular system, an agreement can exist between two operators from the respective countries that a roaming mobile telephone is to be connected to the range of services offered by the respective operator. Such agreements are normally drawn up with several operators in each respective country. As such, the telephone can select to use a certain operator based on the signal strength in connection with roaming. This does not necessarily mean that the choice of respective operator for the customer will be the cheapest or, for other reasons, the most attractive.

Another common scenario when roaming is that the choice of operator in the country that the mobile telephone carrier is visiting differs according to the place or location in the country in which the carrier finds himself, which means that the operator is exchanged in an uncontrolled manner. This form of exchange of operator is in no way whatsoever tied to the cost for a call or other specific wishes for the telephone services on offer to the carrier.

There thus exists a need for a roaming procedure that allows carriers of a mobile station such as a mobile telephone, electronic "notebook", palm top, lap top or similar that includes cellular telecommunications to themselves decide which is the most suitable operator from country to country.

Through EP 0998059 A1, a "Mobile communication terminal with a removable data module for access to a first or second communication network" with an exchangeable module for use in two different cellular systems is already known. This module includes

technical data so that the module allows a mobile station to be used in both of these systems. The EP document does not discuss roaming and the problems associated with it.

Through EP 0982876 A1, an arrangement designated "Communications apparatus and method for handling short messages for a telephone terminal" as well as a method for this 5 is already known. The EP document describes how an SMS is transferred to a removable memory in the arrangement. The document does not discuss roaming and the above named problems connected with roaming.

The international application WO 99/30479 relates to a system and a procedure for network selection based on roaming charges. In the said document, it is required that a 10 "roaming" partner, i.e. two or more mobile telephone operators in, for example, different countries that have a roaming agreement with one another, provide each other with price information. As such, there is no guarantee that all the alternatives for cost-effective roaming are obtained for a roaming mobile telephone.

According to WO 99/30479, each roaming partner must know whether the home 15 operator of a roaming mobile telephone applies IOT, an extra charge, or another tariff to be at all able to indicate a price for a service.

WO 99/30479 also requires that the respective roaming partner knows the tariffs of the home operator in detail in order to be able to provide a roaming mobile telephone with the correct price for the user. The document does not mention how the different parameters that 20 steer a tariff for the specific use of a certain service are implemented on any given occasion. Such parameters can be, for example, the home operator, form of subscription, destination, point in time, etc.

In addition, the system according to the said international document transmits roaming information through broadcasting. This means that the same price information reaches 25 all roaming telephones, which means that price information for all home operators must be transmitted by all of the roaming partners. This requires that a mobile station/mobile telephone must contain a list of the roaming partners that have an agreement with the home operator of the mobile station user. This imposes a heavy burden and is not flexible when the number of countries to which the mobile station owner can perform roaming is taken into account.

30 Furthermore, such a list would need frequent updating with regard to changes.

The system according to WO 99/30479 requires that existing components in a mobile telecommunication system, e.g. GSM, are used.

Summary of the described invention

The present invention relates to a procedure and a system for so-called roaming between places where different mobile telecommunications operators operate. More specifically, the invention offers carriers of a mobile station the chance to themselves choose an operator that suits them. In this way, the call charges of the respective operator are of major significance for the choice.

An important aspect of the present invention is that it is up to the user of the mobile station to choose the operator when roaming.

In particular, the present invention solves those problems that have been mentioned above with a system similar to that described in WO 99/30479 in that:

- 10 – Price information is supplied by an independent operator.
- Only the independent operator need know the tariffs of the other operators.
- The invention takes account of the different parameters that steer a tariff.
- Only relevant, tailor-made information is sent to all roaming mobile stations, which achieves independence from broadcasting regarding roaming information for updating a
- 15 mobile station.
- The invention does not require any list according to that above in each mobile station.
- The invention is not dependent on network components.

Thus, the present invention specifies a procedure for choosing an operator in a cellular mobile telephone system when roaming between countries or between places with
20 more than one operator.

The procedure includes the steps:

- to store locally in a mobile station current information for choosing at a specific point in time the most cost-effective operator among several in a specific country;
- 25 to initiate a program application for roaming existing in a mobile station in conjunction with setting up a telecommunication service in the mobile station;
- to store in each and every one of the mobile stations connected to the system tailor-made, relevant roaming information for each individual mobile station, which achieves independence from broadcasting regarding roaming information for updating a mobile station;
- 30 to analyse the said locally stored information for choosing the most cost-effective operator at a particular point in time by means of the said program application; and
- to arrange operators in the specific country in an order of rank based on the cost of a call, whereby the user is given the opportunity to choose via the mobile station the most cost-effective operator for the country in question.

In one embodiment of the present invention, the user of the mobile station can set the automatic selection of the most cost-effective operator via the application. In another embodiment, the user of the mobile station can select the operator manually from the ranking order via the program function.

5 A further embodiment includes the user being able to initiate storage of the said current information via the mobile station.

Another embodiment includes the user being able to automatically obtain storage of the said current information initiated by the act of roaming.

Yet another embodiment includes that the application is stored in a Subscriber 10 Identity Module memory through a "Subscriber Identity Module tool kit". Another embodiment includes that the application is stored in a permanent electronic memory in the mobile station (the telephone exclusive of the SIM card).

In addition, the present invention specifies a system for choosing an operator in a cellular mobile telephone system when roaming between countries or places that require 15 roaming.

The system includes:

electronic memory to store locally in a mobile station current information for choosing at a specific point in time the most cost-effective operator among several in a specific country;

20 means of initiation to initiate a program application for roaming existing in a mobile station in conjunction with setting up a telecommunication service in the mobile station;

storage in each and every one of the mobile stations connected to the system of tailor-made, relevant roaming information for each individual mobile station, which achieves independence from broadcasting regarding roaming information for updating a mobile station;

25 means of analysis to analyse the said locally stored information for choosing the most cost-effective operator at a particular point in time by means of the said program application; and

means to arrange operators in the specific country in an order of rank based on the cost of a call, whereby the user is given the opportunity to choose via the mobile station the 30 most cost-effective operator for the country in question.

In one embodiment of the present invention, the user of the mobile station can set the automatic selection of the most cost-effective operator via menu-steering the application through the keyboard of the mobile station. In another embodiment, the user of the mobile

station can select the operator manually from the ranking order via menu-steering the application through the keyboard of the mobile station.

A further embodiment of the invention includes the user being able to initiate the storage of the said current information via the mobile station.

5 Another embodiment includes the user being able to automatically obtain storage of the said current information initiated by the act of roaming.

In one embodiment, the application is stored in memory included in a Subscriber Identity Module memory through the use of a "Subscriber Identity Module tool kit".

10 Yet a further embodiment includes that the application is stored in a permanent memory included in the mobile station (the telephone exclusive of the SIM card).

Brief description of the drawings

In the following, regular reference is made in the descriptive text to the attached figures to clarify the understanding of the present invention with its embodiments and examples, whereby;

15 **Fig. 1** illustrates schematically how a customer orders a roaming service according to one embodiment of the present invention;

Fig. 2 illustrates schematically what happens when a customer activates his mobile telephone when roaming to another country according to one embodiment of the present invention;

20 **Fig. 3** illustrates schematically how a customer makes a call from another country according to one embodiment of the present invention;

Fig. 4 illustrates schematically an application dialog when roaming according to one embodiment of the present invention; and

25 **Fig. 5** illustrates schematically an embodiment of a technical architecture according to one embodiment of the present invention.

Tables

In the current description, reference is made to tables of tariff models on the last page, where;

30 **Table 1** shows the tariff model of the UK operator ONE2ONE® for "roamers" as of 31/8, 1999; and

Table 2 shows the price differences at different points in time for the tariff models of the UK operators ONE2ONE® and ORANGE®.

Detailed descriptions of preferred embodiments

The present invention concerns providing locally in the mobile station/terminal of a user current information about tariff models of operators accessible by the terminal through:

- i) initiating a mobile station/terminal-based program application.
- ii) by means of the terminal-based program application, search among the tariff models of accessible operators and arrange the operators in an order of rank from a cost point of view with reference to the time of day regarding the magnitude of the charges, and to offer the user the possibility to either automatically or manually choose the most cost-effective operator.

A mobile station (terminal) can comprise a SIM-card, telephone and/or other physical device. Information about tariff models when roaming can be stored at any suitable location in a mobile station, most often in some form of electronic memory unit.

10 Telecom services include, among others, telecommunication, data, fax, SMS, GPRS (General Packet Radio Service) or similar.

One way to trigger/initiate a mobile station/terminal-based application/service in conjunction with setting up a call is, for example, with Call Control, which is a function in the SIM tool kit specification, standard ETSI GSM 11.14.

15 The price of a call is determined, among other things, by unit quantities such as weekday, point in time, origin, destination, duration of call, and type of telecom service. This means that it is only when a user of a mobile station has stated the destination that relevant and 20 easy to understand price alternatives can be presented by the mobile station/terminal-based program application, see Tables 1 and 2. The tables are self-explanatory and are therefore not described further. The costs are given in British pounds (GBP) and Swedish crowns (SEK) in the tables.

Fig. 1 illustrates schematically how a customer orders a roaming service according to one embodiment of the present invention. In the attached figures, the single direction arrows designated 1)-6) show schematically the sequence of signals. The customer 10 orders 1) the service for cost-effective roaming between two countries from, for example, a GSM operator 12, designated with a circle in Fig. 1. Billing and customer service 14 at the operator 12 send the necessary customer information 2) for the service to an administrator 16, 30 here designated "Roaming Assistant". In turn, the administrator 16 sends 3), in this embodiment with one or more SMS, an agent here designated "Location Agent" to the SMS centre 18 of the mobile operator 12 for communicating SMS to subscribers of operator 12. These SMS are further passed on 4) to the mobile station 20, here a cellular telephone that is

included in the customer information 2), whereby the mobile station now subscribes to the cost-effective roaming that the administrator 16 offers.

In one embodiment according to the present invention, the said agent with the customer-specific information can be downloaded via the SMS tool kit according to the above 5 standard during initiation of the roaming service. The roaming service application can be downloaded to the mobile station according to other programming methods known to a person skilled within the area of technology.

Thus, Fig. 1 illustrates, among other things, the ordering process in which the subscriber 10 calls the customer service 14 of his operator 12 and orders 1) the Roaming 10 Assistant service 16. The administrator 16 obtains information 2) about the mobile number of the subscriber, whereby during the call signal 3)-4), an application for cost-effective roaming is distributed via the mobile telecommunication system of the operator 12 using SMS as carrier. The application Location Agent has the task of informing the Roaming Assistant 16 when the subscriber is abroad or, expressed in another way, is separated from his home network 12.

15 Fig. 2 illustrates schematically what happens when a customer 10 activates his mobile station when roaming to another country according to one embodiment of the present invention. A customer 10 with mobile station 20 is abroad and is about to connect his station 20 to a foreign operator 22 for mobile telecommunications. The customer has previously obtained the cost-effective roaming service with an application for this according to the present 20 invention from his roaming assistant administrator 16 via the home operator 12 for mobile telecommunications. Both operators have SMS centres 18 for forwarding SMS or similar. The application is preferably a software program for performing functions in conjunction with cost-effective roaming in the mobile station.

The customer 10 abroad activates his mobile station 20, whereby the operators 12, 25 22 automatically identify the location of the mobile station through VLR (Visitor Location Register) and HLR (Home Location Register) in GSM or similar for other systems. An SMS with the location of the mobile station is sent 1) automatically via the application for cost-effective roaming (or Location Agent) that is downloaded at the initiation of the service according to that described for Fig. 1. Both SMS centres 18 forward the SMS with the stated 30 position 2)-3) to the administrator 16 who in turn sends 4) one or more SMS with country-specific tariff information in the form of a "Cost Agent" via both SMS centres 18 4)-5). Refer to Table 2 for an example of the information transferred.

The foreign operator 22 sends 6), via its SMS centre 18, the Cost Agent with the current tariff information for the operators in the country where the customer 10 with the mobile station 20 happens to be, see Table 2 for Great Britain.

In summary, according to Figs. 1 and 2, Location Agent informs 3), Fig. 1,

5 Roaming Assistant 16 that includes a server about the position of the customer 10/user as well as the type of mobile station/terminal, for example, single or dual band, via SMS, 1)-3) in Fig. 2. In conjunction with the telephone being activated, this achieves that the application is triggered, either at activation or manually, i.e. the user 10 starts the application via a menu and thereby notifies his position.

10 The Roaming Assistant server 16 analyses the position and sends relevant tariff models as well as application logic that together comprise the Cost Agent. The SMS message is the carrier of a country-specific Cost Agent according to 4)-6) in Fig. 2.

15 Relevant tariff models mean those with which the operator 12 of the customer/subscriber 10 has a roaming agreement plus support for the single or dual band of the mobile station/terminal, etc.

Alternative techniques to inform the Roaming Assistant server about ones position do exist. One is that the home network Mobile Services Switching Centre (MSC) and Visitor Location Register (VLR) inform the Roaming Assistant server when a subscriber finds himself outside of the home network via a Mobile Positioning System (MPS). This means that 20 an interface is set up between MPS and the Roaming Assistant server. It is thus possible to configure the subscribers about which MPS is to report and the conditions for this, e.g. when a subscriber finds himself outside of the home network.

Another possibility is found in that a customer/subscriber 10 informs Roaming Assistant server 30 manually before travelling to a foreign country, after which relevant data 25 about tariff models is downloaded to the terminal.

Regarding Wireless Application Protocol standard (WAP), there also exists other possibilities, whereby a customer/user 10 connects himself to a WAP portal via a WAP terminal 20. The portal offers a service that gives price information about competing operators by downloading selected tariff models plus a mobile station/terminal-based program 30 application.

In one embodiment of the present invention, the terminal-based program application that handles the Location Agent/Cost Agent can be pre-installed in conjunction with the production of a SIM card or at some other occasion between the ordering of the Roaming

Assistant and the actual use of the service. As such, this specifies an alternative to the applications being downloaded via SMS or similar.

In one embodiment of the present invention, when a customer/user 10 is to make the first call in the country where he happens to be, that described in Fig. 3 can take place.

5 Here, a roaming customer 10 calls 1) a telephone number to come into contact with a B-subscriber. The choice of operator in the country where the customer happens to be is determined by the customer 10 through a dialog 2) with the Cost Agent that has been previously sent to the station 20 via, for example, one or more SMS from the administrator 16. Assume that the time is 19.00 in the country where the customer is. Then the customer can, via 10 the dialog 2), preferably select the foreign operator ORANGE®, who at that stated time has a cost for the call of GBP 0.5/min, equivalent to SEK 6.81/min, see Table 2. At the same point in time, a call via the operator ONE2ONE® costs GBP 1.16/min, equivalent to SEK 15.80/min. Here, ORANGE® is thus the most cost-effective choice of operator. The choice of operator can be made via the keyboard of the mobile station every time a call is initiated 3) or be set up once 15 and for all until it is changed via dialog 2), or be made automatically according to the application with the program for the most cost-effective roaming that has previously been downloaded in the mobile station 20 during the initiation of the service via the administrator 16. Billing and customer service 14 at ORANGE® invoice the cost of the call to the home operator 12.

20 Fig. 4 illustrates schematically how a dialog with the application in the mobile station is performed by the customer 10 with the mobile station 20. Fig. 4 is largely self-explanatory. The application achieves a price list for two operators in the UK, Vodafone® and Cellnet®, when the customer calls the number +46 708343343. The customer 10 chooses Vodafone®, which is here the most cost-effective for the time in question, and calls via them.

25 The arrows in Fig. 4 show the course of this act.

Fig. 5 illustrates schematically an embodiment of a technical architecture according to one embodiment of the present invention, more specifically, the architecture surrounding the Roaming Assistant (the administrator) 16. The administrator 16 incorporates a roaming assistant server 30. The server 30 has an interface 32 with an external “Billing and Customer Care (B&CC)” 34, i.e. a centre that handles customer invoicing for mobile services as well as customer support. The interface 32 connects B&CC 34 with a database 36, here designated “Roaming Assistant database”. The database 36 has a directory 10 with customers 30 for cost-effective roaming according to the invention. Two servers are connected to the database 36 for traffic between the GSM network 44, input server 40 and output server 42. As

described previously, SMS can, for example, be transmitted between the GSM network 44 and the input server 40 and output server 42 and vice versa. The servers 40, 42 can naturally forward signals other than SMS signals that occur in a mobile telecommunications data network 44.

5 A procedure for choosing an operator 22 is specified according to the present invention in a cellular mobile telephone system when roaming. It includes the steps:

to store locally in a mobile station 20 current information for choosing at a specific point in time the most cost-effective operator 22 among several in a specific country;

10 10 to initiate a program application for roaming existing in a mobile station 20 in conjunction with setting up a telecommunication service in the mobile station;

to store in each and every one of the mobile stations connected to the system tailor-made, relevant roaming information for each individual mobile station 20, which achieves independence from broadcasting regarding roaming information for updating a mobile station 20;

15 15 to analyse the said locally stored information for choosing the most cost-effective operator 22 at a particular point in time by means of the said program application; and

to arrange operators in the specific country in an order of rank based on the cost of a call, whereby the user 10 is given the opportunity to choose via the mobile station the most cost-effective operator 22 for the country in question.

20 20 It is important that each individual mobile station 20 connected to the system receives its specific roaming information depending on where in the world the customer is. For this reason, broadcasting cannot be used for this purpose, at least regarding the updating of information during a roaming procedure that can extend over several countries over a short period of time. Here, broadcasting refers to such techniques that send the same message/information to two or more mobile stations at the same time. Broadcasting is a well-known term within data and telecommunication.

25 The present invention also specifies a system for carrying out the procedure for choosing an operator 22 in a cellular mobile telephone system when roaming. It includes:

30 30 electronic memory to store locally in a mobile station 20 current information for choosing at a specific point in time the most cost-effective operator 22 among several in a specific country;

means of initiation to initiate a program application for roaming existing in a mobile station 20 in conjunction with setting up a telecommunication service in the mobile station;

storage in each and every one of the mobile stations connected to the system of tailor-made, relevant roaming information for each individual mobile station 20, which achieves independence from broadcasting regarding roaming information for updating a mobile station;

5 means of analysis to analyse the said locally stored information for choosing the most cost-effective operator 22 at a particular point in time by means of the said program application; and

means to arrange operators in the specific country in an order of rank based on the cost of a call, whereby the user 10 is given the opportunity to choose via the mobile station the
10 most cost-effective operator 22 for the country in question.

Applications, means and functions can, according to the invention, be achieved in the form of program software and hardware or through a combination of these by techniques known to a person skilled in the art.

The present invention is not restricted to the examples and embodiments found in
15 the description, rather it is the wording of the attached claims that specify further embodiments for a person skilled in the technology area.

Table 1**ONE2ONE Tariff model för “roamers” (31/8 -99)**

Call			Time		Cost (GBP)		Cost (SEK)
From	To	Day	From	To		Per minute	
England	Sweden	Mon-Fri		08.00	20.00	1.16	15.80
England	Sweden	Other	-	-		1.07	14.58

5 Table 2**ONE2ONE Tariff model för “roamers” (31/8 -99)**

Call			Time		Cost (GBP)		Cost (SEK)
From	To	Day	From	To		Per minute	
England	Sweden	Mon-Fri		08.00	20.00	1.16	15.80
England	Sweden	Other	-	-		1.07	14.58

ORANGE Tariff model för “roamers” (31/8 -99)

Call			Timt		Cost (GBP)		Cost (SEK)
From	To	Day	From	To		Per minute	
England	Sweden	Mon-Fri		08.00	18.00	0.75	10.22
England	Sweden	Other	-	-		0.5	6.81

Claims

1. Procedure for choosing an operator (22) in a cellular mobile telephone system during roaming **c h a r a c t e r i s e d** in that it includes the steps:

5 to store locally in a mobile station (20) current information for choosing at a specific point in time the most cost-effective operator (22) among several in a specific country or other area;

to initiate an existing program application for roaming already stored in a mobile station (20) in conjunction with setting up a telecommunication service in the mobile station;

10 to store in each and every one of the mobile stations (20) connected to the system tailor-made, relevant roaming information for each individual mobile station (20), which achieves independence from broadcasting regarding roaming information for updating the mobile station (20);

to analyse the said locally stored information for choosing the most cost-effective operator (22) at a particular point in time by means of the said program application; and

15 to arrange operators in the specific country in an order of rank based on the cost of a call, whereby the user (10) is given the opportunity to choose via the mobile station the most cost-effective operator (22) for the country in question.

2. Procedure according to claim 1 **c h a r a c t e r i s e d** in that the user (10) of the mobile station (20) can set the automatic choice of the most cost-effective operator via the application.

3. Procedure according to claim 1 or 2 **c h a r a c t e r i s e d** in that the user (10) of the mobile station (20) can manually choose the operator (22) from the order of rank via the program application.

25 4. Procedure according to any of claims 1 to 3 **c h a r a c t e r i s e d** in that the user initiates storage of the said current information via the mobile station.

5. Procedure according to any of claims 1 to 3 **c h a r a c t e r i s e d** in that the user automatically obtains storage of the said current information initiated by performing roaming.

30 6. Procedure according to any of claims 1 to 5 **c h a r a c t e r i s e d** in that the application is stored in a Subscriber Identity Module memory through the "Subscriber Identity Module tool kit".

7. Procedure according to any of claims 1 to 5 **c h a r a c t e r i s e d** in that the application is stored in a permanent electronic memory in a mobile station.

8. System for choosing an operator (22) in a cellular mobile telephone system during roaming **characterised** in that it includes:

electronic memory to store locally in a mobile station (20) current information for choosing at a specific point in time the most cost-effective operator (22) among several in a specific country or other area;

means of initiation to initiate an existing program application for roaming already stored in a mobile station (20) in conjunction with establishing a telecommunication service in the mobile station;

storage in each and every one of the mobile stations (20) connected to the system of tailor-made, relevant roaming information for each individual mobile station (20), which achieves independence from broadcasting regarding roaming information for updating the mobile station (20);

means of analysis to analyse the said locally stored information for choosing the most cost-effective operator (22) at a particular point in time by means of the said program application; and

means to arrange operators in the specific country in an order of rank based on the cost of a call, whereby the user (10) is given the opportunity to choose via the mobile station the most cost-effective operator (22) for the country/area in question.

9. System according to claim 8 **characterised** in that the user (10) of the mobile station (20) can set the automatic choice of the most cost-effective operator via menu-steering the application through the keyboard of the mobile station.

10. System according to claim 8 or 9 **characterised** in that the user (10) of the mobile station (20) can manually choose the operator (22) from the order of rank via menu-steering the application through the keyboard of the mobile station.

25 11 System according to any of claims 8 to 10 **characterised** in that the user initiates storage of the said current information via the mobile station.

12 System according to any of claims 8 to 10 **characterised** in that the user automatically obtains storage of the said current information initiated by performing roaming.

30 13 System according to any of claims 8 to 12 **characterised** in that the application is stored in a memory included in the Subscriber Identity Module memory through use of the "Subscriber Identity Module tool kit".

14 System according to any of claims 8 to 12 **characterised** in that the application is stored in a permanent electronic memory included in a mobile station.

1/3

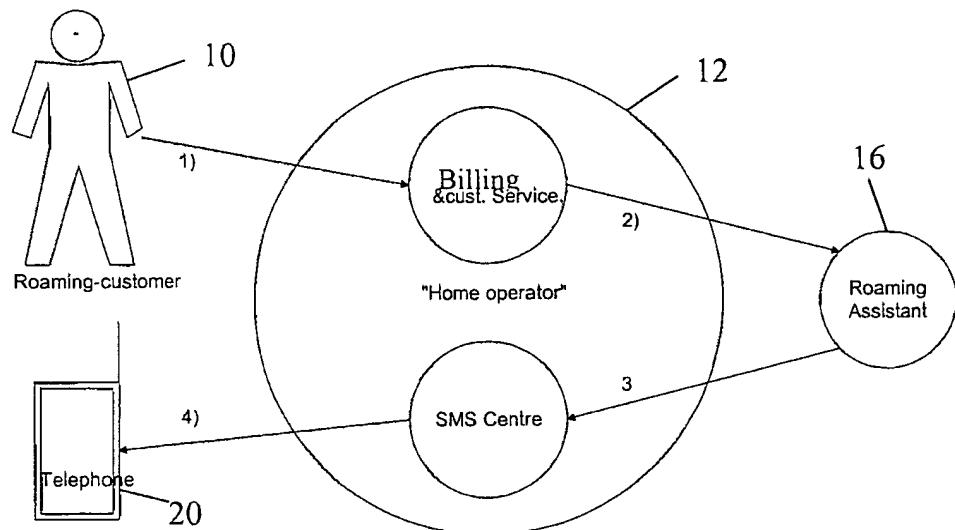


Fig. 1

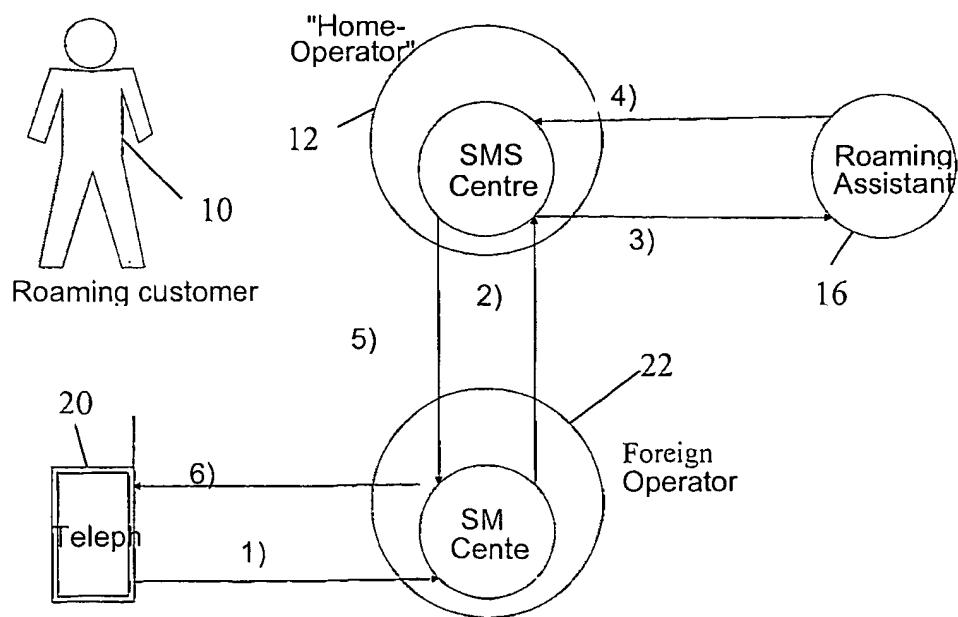


Fig. 2

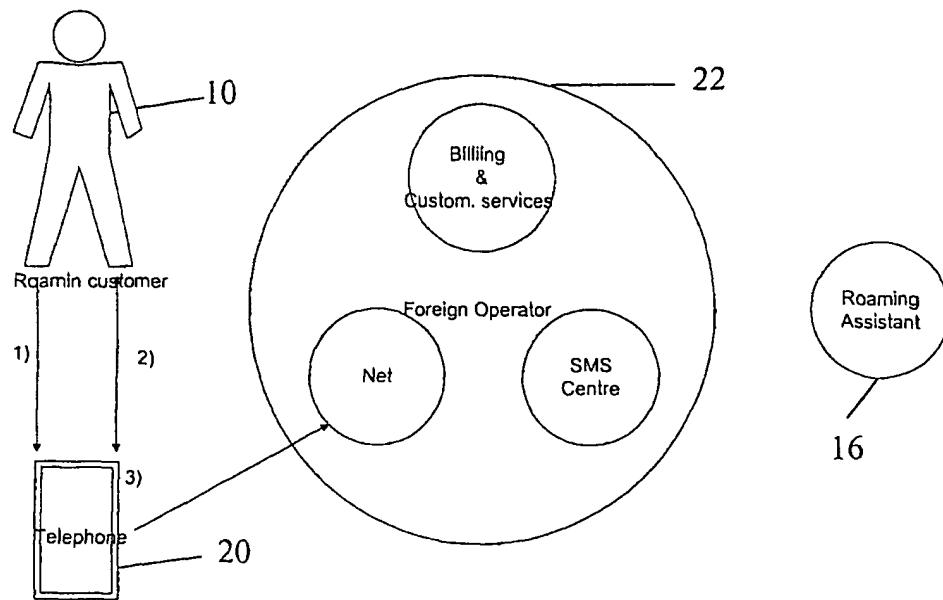


Fig. 3

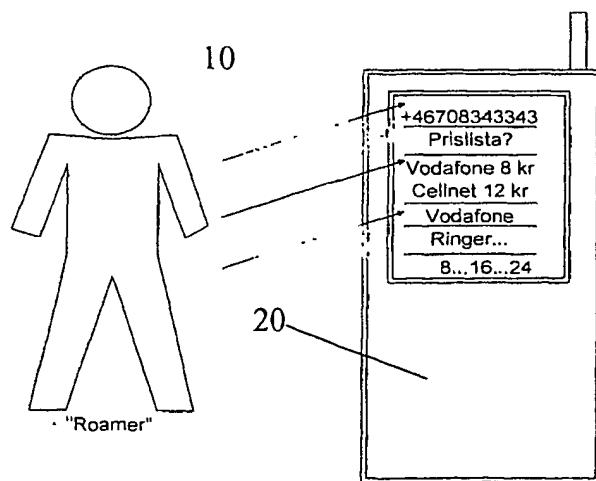


Fig. 4

3/3

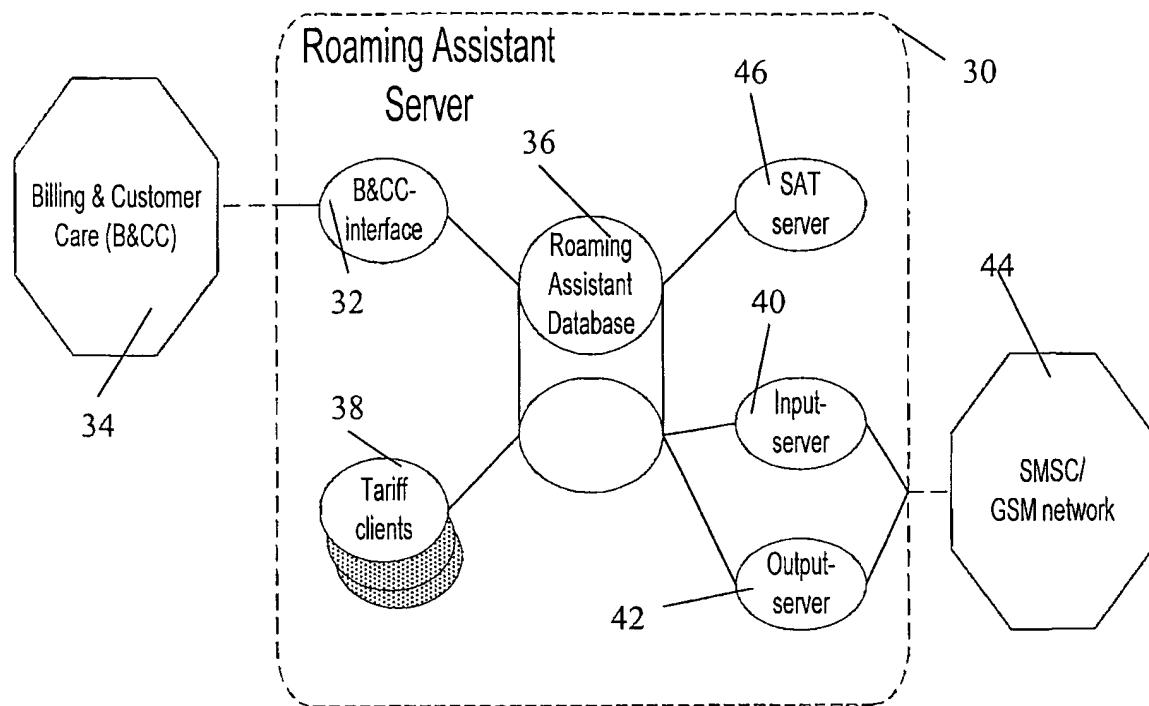


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/02177

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q, H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9916267 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 1 April 1999 (01.04.99), page 2, line 24 - page 3, line 19; page 6, line 14 - page 8, line 11, figure 2, claim 8, abstract --	1-14
A	WO 9930479 A1 (ERICSSON INC.), 17 June 1999 (17.06.99), page 5, line 28 - page 6, line 4, figures 1-2, claims 1,10,21,26 --	1-14

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
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- "P" document published prior to the international filing date but later than the priority date claimed

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"&" document member of the same patent family

Date of the actual completion of the international search

29 January 2002

Date of mailing of the international search report

30-01-2002

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/02177

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 9858512 A1 (SIEMENS BUSINESS COMMUNICATION SYSTEMS INC), 23 December 1998 (23.12.98), page 9, line 3 - line 29; page 12, line 13 - page 13, line 3; page 14, line 26 - page 15, line 5, page 15 line 26 - page 16 line 8, page 17 line 31 - page 18 line 3, abstract</p> <p>--</p>	1-14
A	<p>WO 0041486 A2 (PATHFINDER TECHNICAL RESOURCES LIMITED), 20 July 2000 (20.07.00), page 3, line 15 - line 24; page 10, line 19 - page 11, line 8; page 13, line 5 - line 9</p> <p>--</p> <p>-----</p>	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

27/12/02

International application No.

PCT/SE 01/02177

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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